

# Pteridophytic Flora of Rajasthan: A Review

Shri Praveen Kumar Chandel

Assistant Professor in Botany, Government College, Barmer, Rajasthan, India

## ABSTRACT

About 63 species belonging to 29 genera of pteridophytes have till date have been reported from Rajasthan dating from king's "Sketch of flora of Rajputana" (1878-79). But an exhaustive survey of all pteridophytic localities during different seasons of the year during the past decade (1975-85) has revealed the occurrence of many species belonging different genera. Thus, *Athyrium hohenokerianum*, *Asplenium lanulatum*, *Cheilanthes belangeri*, *Botrychium lanuginosum*, *Dryopteris parasitica*, *Pityrogramma calomelanos*, *Pteris cretica* and *Athyrium parasnathense* are seen. This may be regarded as a clear indication that these taxa have recently been lost/eradicated from Rajasthan due to one factor or the other. It has also been regularly observed that the population densities of many of the present day. Rajasthan pteridophytes have been decreasing at an alarming rate specially in respect to such restricted taxa as *Asplenium pumilum* var. *hymenophylloides*, *Selaginella rajasthanensis*, *Isoetes reticulata*, *I. rajasthanensis* and *Marsilea aegyptiaca*. Similarly, populations of some ferns growing at Mt. Abu like *Ophioglossum gramineum*, *Araiostegia pseudocystopteris*, *Pteris vittata*, *Dryopteris cochleata* and *Nephrolepis cordifolia* are also becoming thin and localised and reported as "seriously rare" taxa of Mt. Abu. Seriousness and severity of the threat to pteridophytic flora of this region is emphasized specially because of the scantier floristic resources of the state. *Adiantum recurvatum* (D.Don) Fras. –Jenk is a new record to the pteridophytic flora of Rajasthan.

**KEYWORDS:** pteridophytes, Rajasthan, flora, species, restricted, genera, taxa, record

## INTRODUCTION

Rajasthan state is situated in between 2303' and 30012' N latitude and 6903' and 78012' E longitude. The Aravalli ranges which is one the oldest mountain range of the world, divides the Rajasthan into two vegetational segments like xerophytic and mesic. Todgarh-Raoli Wildlife Sanctuary located in central position of Aravalli range. Xerophytic and mesic vegetation occurs as mixed formation in this Sanctuary.[1,2]



Todgarh-Raoli Wildlife Sanctuary

**How to cite this paper:** Shri Praveen Kumar Chandel "Pteridophytic Flora of Rajasthan: A Review" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-6 | Issue-3, April 2022, pp.97-101, URL: [www.ijtsrd.com/papers/ijtsrd49487.pdf](http://www.ijtsrd.com/papers/ijtsrd49487.pdf)



IJTSRD49487

Copyright © 2022 by author(s) and International Journal of Trend in Scientific Research and Development Journal. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (<http://creativecommons.org/licenses/by/4.0/>)



The sanctuary is also an ecotone of both vegetational segments. Naturally variations in Pteridophytic flora are represented in this region. It is bounded on the north by Ajmer district, on the south by Udaipur district, on the east by Rajsamand district and on the west by Pali district. Out of 09 genera of fern and fern allies distributed in the various localities of Todgarh-Raoli wild life sanctuary 04 genera namely *Actiniopteris*, *Cheilanthe*, *Salvinia* and *Azolla* are representing by single species each. *Marsilea* is represented by two species while *Adiantum* is represented by three species. [3,4]

**Actiniopteris**

The majority of fern genera represented in single species in the sanctuary. We have frequently observed that the population densities as well as number of individuals of *Marsilea aegyptiaca*, *Adiantum philippense* and *Cheilanthes farinosa* species fall in the category of RET and many fern taxa are gradually decreasing at an alarming rate. *Actiniopteris radiata* (Swartz) Link, is one of the most widely distributed xerophytic fern of Todgarh-Raoli wild life sanctuary. Grows on old walls and in rock crevices. *Adiantum capillus-veneris*, *Marsilea minuta* and *Azolla pinnata* is commonly found. [5,6]

**Cheilanthes farinosa**

The area of KWS has been found to be rich in pteridophytic floral diversity. A total of 15 species belonging to 11 genera and six families of pteridophytes have been recorded from the area of this Sanctuary of Rajasthan. Of these, six pteridophytic species namely *Equisetum ramosissimum* Desf. subsp., *Adiantum caudatum* L., *Azolla pinnata*, *Marsilea minuta* L., *Ceratopteris thalictroides* (L.) Brong., and *Ophioglossum petiolatum* Hook. have been recorded for the first time from this locality. *Asplenium pumilum* and *Christella dentata* (Forsk.) Holttum recorded by earlier workers could not be relocated despite the keen and thorough search of the localities reported by them.[9,10]

**Azolla**

Kumbhalgarh Wildlife Sanctuary in the south central part of Rajasthan spreads over the Udaipur, Pali, Ajmer and Rajsamand districts of Rajasthan state and forms a special ecotone between hilly forests of Aravallis and Thar Desert located in the west. The pteridophytes which form a sizeable component of floral resources of Rajasthan are of tremendous academic and medicinal importance, have largely been neglected from this sanctuary, therefore, to document and find out the present status of these plant species, Kumbhalgarh Wildlife Sanctuary of Rajasthan was visited time and again.[7,8]

**Kumbhalgarh Wildlife Sanctuary**

Dense populations of *Pteris vittata* L. and *Equisetum ramosissimum* have been recorded at several localities in this sanctuary area which is rarely seen in other parts of the state. Genus *Adiantum* has been found to be represented by four species *Aleuritopteris* by two and rest of the genera are represented by single species. Pteridophytes represent ancient lineages of plants, they are widely distributed yet exhibit habitat specificity, therefore any human interference in their natural habitat may lead to their decline. Therefore, steps for their conservation should be taken up keeping in view the scantier floristic resources of the state.[11,12]



*Equisetum ramosissimum*

### Discussion

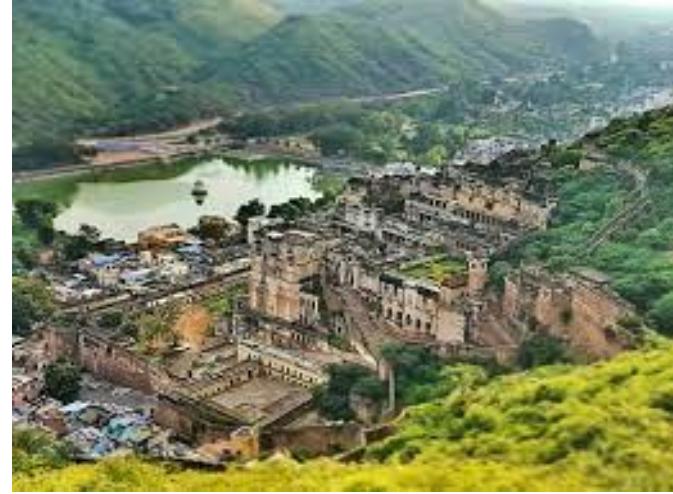
Ferns present an array of cytological complexities with allopolyploidy playing a pivotal role in speciation. It was this realization which prompted cytological study of the rare endemic population of *Marsilea coromandelina* found in a small patch en route Borawas. Besides, spore germination experiments have also been taken up in *M. minuta* and *M. coromandelina* populations of Kota. [13]



**Aravalli Ranges**

Though, such studies have been undertaken in the desert taxa of *Marsilea* eg. *M.aegyptiaca*, *M.rajasthanensis*, and *M.diffusa* by Bhardwaja and his associates (1997), such studies have now been carried out in *M. minuta* and *M. coromandelina* for the first time in the hope that this will add to our knowledge of this complex genus and its distribution in Rajasthan. Pteridophytic flora of Rajasthan is mostly confined to Mt. Abu and Hadauti plateau which face interesting diversified status due to their variable climatic conditions. Extremity of climate is a characteristic feature of Rajasthan. Due to heavy rainfall, Mt. Abu possesses the richest vegetation of pteridophytes (approx 36 species, 15 genera) in entire Rajasthan. It is only during the rainy months that the ferns mainly flourish and are plentiful in number. In addition to Aravalli ranges, these vascular cryptogams are frequently observed in Hadauti plateau where thick and dense forests, wet and shady

habitats, streams, springs and other water reservoirs exist and are known as favorite shelter places for pteridophytic species.



**Hadoti Plateau**

The North and North-East portions of the state are poor in pteridophytic vegetation as these areas are full of sand dunes.



*Selaginella reticulata*

However, along the banks of ponds, a few species of *Marsilea* e.g. *M.aegyptica* at Jodhpur, *M. minuta* and *M.rajasthanensis* at Kolyat (Bikaner) grow during rainy season. Therefore, pteridophytes of Hadauti plateau hold a significant position with respect to their occurrence and distribution. During rainy season a number of pteridophytes grow and survive in the valleys and ravines of River Chambal. *Selaginella reticulata* (Hook. & Grey.) Spring (Selaginellaceae) - A New Record to the Pteridophytic Flora of Rajasthan has been accessed.[14]

### Results and Conclusions

Pteridophytes, the seedless vascular plants, had a very flourishing past in dominating the vegetation on the earth about 280-230 million years ago. Although they are now largely replaced by the seed bearing vascular plants in the extant flora today, yet they constitute a fairly prominent part of the present day vegetation of the world. India with a highly variable climate has a rich diversity of its flora and Pteridophytic flora

greatly contributes to its diversity. Pteridophytes also form an interesting and conscious part of our national flora with their distinctive ecological distributional pattern. [15]



*Aleuritopteris*

On a very conservative estimate 500 species of ferns and 100 species of fern-allies are on record from India. According to a census, the Pteridophytic flora of India comprises of 67 families, 191 genera and more than 1,000 species including 47 endemic Indian ferns, less than 10% of those reported previously and 414 species of Pteridophytes (219 At risk, of which 160 critically endangered, 82 Near-threatened and 113 Rare), constituting 41-43 % of the total number of 950- 1000 Pteridophytes of India. Chandra Shubhash (2000) recorded 34 families, 144 genera and more than 1100 species of ferns with about 235 endemic species from Indian region. The vascular flora of our country in general has about 15,000 species and as a constituent of Indian flora of vascular plants, the ferns and fern-allies form only five percent part as far as the number of species is concerned. But, due to their abundance in individuals as well as their conspicuousness in epiphytic vegetation and in the terrestrial vegetation along forest margins, roadsides and forest floors, the contribution of ferns and fern-allies to the vegetational pattern in India rank only next to the flowering plants.[16]

## References

- [1] Cantino, Philip D.; Doyle, James A.; Graham, Sean W.; Judd, Walter S.; Olmstead, Richard G.; Soltis, Douglas E.; Soltis, Pamela S.; Donoghue, Michael J. (1 August 2007). "Towards a Phylogenetic Nomenclature of Tracheophyta". *Taxon*. 56 (3): 822. doi:10.2307/25065865. JSTOR 25065865.
- [2] Christenhusz, M. J. M.; Zhang, X. C.; Schneider, H. (18 February 2011). "A linear sequence of extant families and genera of lycophytes and ferns" (PDF). *Phytotaxa*. 19 (1): 7. doi:10.11646/phytotaxa.19.1.2.
- [3] Christenhusz, Maarten J.M. & Chase, Mark W. (2014). "Trends and concepts in fern classification". *Annals of Botany*. 113 (9): 571–594. doi:10.1093/aob/mct299. PMC 3936591. PMID 24532607.
- [4] Clark, James; Hidalgo, Oriane; Pellicer, Jaume; Liu, Hongmei; Marquardt, Jeannine; Robert, Yannis; Christenhusz, Maarten; Zhang, Shouzhou; Gibby, Mary; Leitch, Ilia J.; Schneider, Harald (May 2016). "Genome evolution of ferns: evidence for relative stasis of genome size across the fern phylogeny". *New Phytologist*. 210 (3): 1072–1082. doi:10.1111/nph.13833. PMID 26756823.
- [5] Chase, Mark W. & Reveal, James L. (2009). "A phylogenetic classification of the land plants to accompany APG III". *Botanical Journal of the Linnean Society*. 161 (2): 122–127. doi:10.1111/j.1095-8339.2009.01002.x.
- [6] Gifford, Ernest M.; Foster, Adriance S. (1996). *Morphology and evolution of vascular plants* (3rd ed.). New York: Freeman. ISBN 0-7167-1946-0.
- [7] Kenrick, Paul; Crane, Peter (1996). "Embryophytes: Land plants". *Tree of Life Web Project*. Retrieved 19 April 2017.
- [8] Kenrick, Paul; Crane, Peter R. (4 September 1997). "The origin and early evolution of plants on land" (PDF). *Nature*. 389 (6646): 33–39. Bibcode: 1997Natur.389...33K. doi:10.1038/37918. S2CID 3866183.
- [9] Kenrick, Paul; Crane, Peter (1997). *The Origin and Early Diversification of Land Plants: A Cladistic Study*. Washington, D.C.: Smithsonian Institution Press. ISBN 9781560987291.
- [10] Pryer, K. M.; Schuettpelz, E.; Wolf, P. G.; Schneider, H.; Smith, A. R.; Cranfill, R. (1 October 2004). "Phylogeny and evolution of ferns (monilophytes) with a focus on the early leptosporangiate divergences". *American Journal of Botany*. 91 (10): 1582–1598. doi:10.3732/ajb.91.10.1582. PMID 21652310.
- [11] Pteridophyte Phylogeny Group (November 2016). "A community-derived classification for extant lycophytes and ferns". *Journal of Systematics and Evolution*. 54 (6): 563–603. doi:10.1111/jse.12229. S2CID 39980610.

[12] Ranker, Tom A.; Haufler, Christopher H. (2008). Biology and Evolution of Ferns and Lycophytes. Cambridge University Press. ISBN 978-0-521-87411-3.

[13] Raven, Peter H.; Evert, Ray F.; Eichhorn, Susan E. (2005). Biology of plants (7th ed.). New York, NY: Freeman and Company. ISBN 0-7167-1007-2.

[14] Schneider, Harald; Schuettpelz, Eric (November 2016). "Systematics and evolution of lycophytes and ferns". Journal of Systematics and Evolution. 54 (6): 561–562. doi:10.1111/jse.12231. S2CID 90542414.

[15] Smith, Alan R.; Kathleen M. Pryer; Eric Schuettpelz; Petra Korall; Harald Schneider; Paul G. Wolf (2006). "A classification for extant ferns" (PDF). Taxon. 55 (3): 705–731. doi:10.2307/25065646. JSTOR 25065646.

[16] Walkowiak, Radoslaw Janusz (2017). "Classification of Pteridophytes - Short classification of the ferns" (PDF). IEA Paper. doi:10.13140/RG.2.2.29934.20809.

